NATIONAL RESEARCH COUNCIL

2101 CONSTITUTION AVENUE, WASHINGTON 25, D. C.

Established in 1916 by the National Academy of Sciences under its Congressional Charter and organized with the cooperation of the National Scientific and Technical Societies of the United States

ADVISORY COMMITTEE ON ARTIFICIAL LIMBS

U. S. Patent Office
DEC 22 1954
DIVISION 55

15 December 1954

Dear Sir:

The enclosed charts present a list of prosthetic devices that comprise an armamentarium for use in the management of children with lower-extremity amputations.

These charts have been reviewed by the Panel on Lower-Extremity Research and Development, advisory to this office, upon whose recommendation they are being released on a provisional basis until more experience can be gained.

Your comments and recommendations concerning the procedures suggested here are earnestly requested by the Panel. These comments, which should be forwarded to this office, will materially aid in the eventual establishment of an armamentarium of a less provisional nature.

Your cooperation in this project will be greatly appreciated.

Sincerely,

F. S. Strong, Jr.

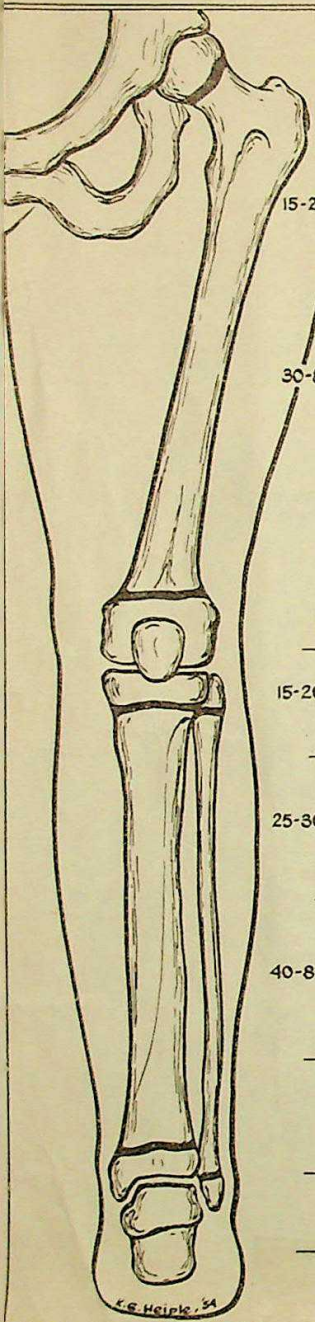
F. S. Strong, Jr.
Executive Director

Enclosures

623/33

Amputee Types & Suggested Prosthetic Armamentarium

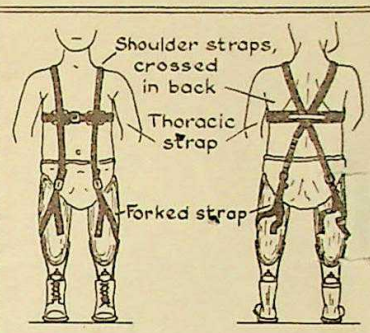
1949. Research continues in materials and patterns.



1 year to 4 years	Amputee Type	Foot	Ankle Assembly	Shin Piece *	Knee	Thigh Piece	Pelvic Piece	Harness	Prosthesis Type
	Hemipelvectomy Hip Disarticulation	Rocker shaped. Rubber or wood. Rubber ferrel.	None to 2 years. / Baby ankle joint.	Double upright metal brace from foot to thigh. / At 4 years, wood or plastic.	None to 4 years. / Standard child size knee bolt.	Wood or plastic.	Moulded leather or plastic. Rigid outside lock, Try canadian type	Crossed shoulder straps, thoracic strap of webbing. Pelvic corset or band.	Tilt table.
15-25 %	High Thigh Very Short Stump	Rubber ferrel. At 2 years rubber or wood rocker.	None to 2 years. / Baby ankle joint.	Up to 3 years metal uprights rivited to thigh piece. / 3 years up, wood or plastic	Standard A.K. knee, single pivot, child's size	Wood or plastic. / Wood or plastic.	None.	Crossed shoulder straps, thoracic strap of webbing. Pelvic band of webbing.	Standard A.K.
30-80 %	Mid Thigh and Low Thigh	Rocker shaped rubber or wood. Rubber ferrel.	None up to 2 years. / 2 years upwards, baby ankle joint.	Metal uprights up to 2 years. / Wood or plastic.	None up to 3 years. / Standard A.K. knee, single pivot, child's size.	Wood or plastic. / Suction socket tolerated at 3 years of age.	None.	Crossed shoulder straps thoracic strap of webbing. Pelvic band of webbing.	Standard A.K. or Suction socket A.K.
	Supracondylar and Disarticulation at knee.	Rocker shaped rubber or wood. Rubber ferrel.	None to 2 years. / Baby ankle joint.	Metal uprights up to 2 years. / Wood or plastic.	None up to 3 years. / Outside standard B.K. joint	Wood or plastic, avoid leather, † Try END BEARING	None.	Crossed shoulder straps thoracic strap of webbing. Pelvic band of webbing.	End bearing knee disarticulation.
15-20 %	Very short Below knee.	Rocker shaped wood or rubber. Ferrel.	Baby ankle joint.	Partial wood socket on metal uprights. Plastic slip socket.	Standard joint, child's size.	Standard complete lacer thigh cuff.	None.	Crossed shoulder strap, thoracic strap, forked strap to bucket anteriorly, elastic strap to thigh cuff post	Slip socket B.K.
25-30 %	Short Below knee - "Conventional"	Wood or rubber. Ferrel.	Baby ankle joint.	Wood or plastic; complete or open end bucket. If partial use metal uprights	Standard joint, child's size.	Standard complete lacer thigh cuff.	None.	Crossed shoulder straps, thoracic strap, forked strap to bucket anteriorly, elastic strap to thigh cuff posteriorly.	Conventional B.K.
40-80 %	Long Below knee and Very long Below knee.	Wood or rubber. Ferrel.	Baby ankle joint.	Wood or plastic. Wood recommended.	Standard joint, child's size.	Standard complete lacer thigh cuff.	None.	Crossed shoulder straps, thoracic strap, forked strap to bucket anteriorly, elastic strap to thigh cuff posteriorly.	Conventional B.K.
	Disarticulation at Ankle.	Rubber. Ferrel.	Rigid.	Wood., If bulbous end, leather. Lacer. END BEARING.	Standard joint, child's size.	Standard. If bulbous end, try Muley strap.	None	As in all B.K. or Muley strap.	Ankle disarticulation, end bearing
	Chopart Lisfranc	Felt or rubber. Plantar plate.	Prosthetic experience is discouraging in Chopart.					None.	Forefoot

*- Parents of girls may demand shaped calf contour (willow wood or plastic).

†- Toddler personal hygiene is poor - "Accidents". Urine soaked leather irritates skin and fissures. Odiferous !!



Toddler Harness

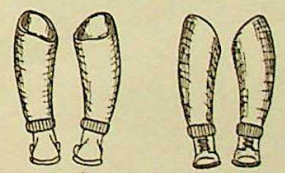
‡All leather parts recommended to be nylon coated.

Sockets in toddlers: thick walls recommended, affording durability and future modeling (relieving) for growth.

Contour modeling (outside) not essential.

When knee joints are incorporated in the prosthesis for hip disarticulation, congenital anomalies, etc., locks are recommended. The knee lock is set for the first 6 months of wearing, or up to the time the amputee can balance. This is especially recommended for bilateral cases. Also true in short B.K. cases.

Early walking patterns in toddlers characteristically demonstrate leg abduction and lordosis. To minimize an extreme abduction pattern, prostheses in bilateral A.K. cases are recommended to be contoured in a bow leg fashion, thus bringing the foot closer in to the midline:



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From the Juvenile Amputee Tre
Center, Mary Free Bed Childre
& Orthopedic Center, Grand R
Under the auspices of the Mich
Crippled Children's Commissi
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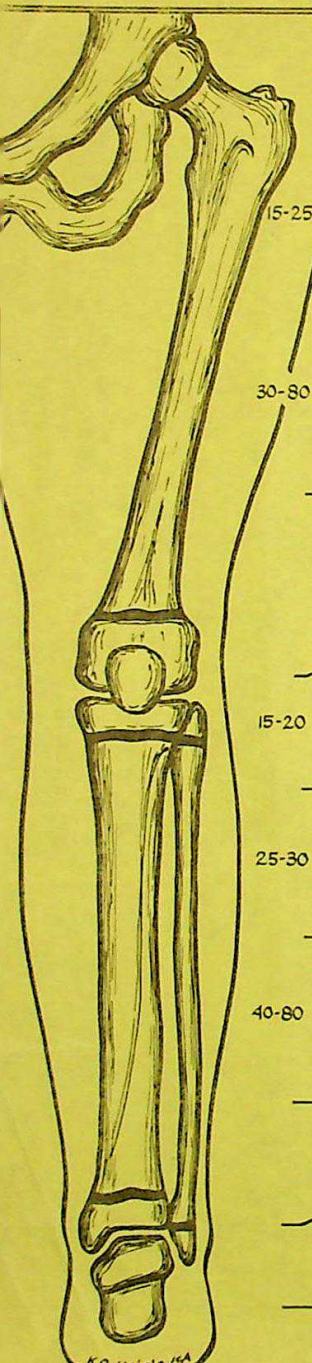

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Dubinshak J. Steensma

5 years to maturity	Amputee Type	Foot *	Ankle Assembly	Shin Piece	Knee	Thigh Piece	Pelvic Piece	Harness	Prosthesis Type
	Hemipelvectomy Hip Disarticulation	Rubber, wood, felt.	Standard.	Wood, plastic.	Standard A.K., single or double pivot.	Wood or plastic. Try Canadian type.	Leather, Celastic.	Thoracic corset, single shoulder strap.	Tilt table or Canadian
15-25 %	High Thigh Very Short Stump	Rubber, wood, felt.	Standard.	Wood recommended.	Standard A.K. single or double pivot.	Wood suction socket. High lateral wall recommended	None.	Metal hip joint, leather pelvic band.	Standard A.K.
		Try solid ankle ‡ cushion heel.							
30-80 %	Mid-Thigh and Low Thigh	Rubber, wood, felt.	Standard.	Wood recommended.	Standard A.K., single or double pivot.	Wood suction socket.	None.	None. May be necessary early in mid-thigh cases.	Standard A.K.
		Try solid ankle cushion heel.							
	Supracondylar and Disarticulation at Knee	Rubber, wood, felt.	Standard.	Wood recommended.	Outside standard B.K. recommended.	Wood suction socket. Valve at patellar area, try end bearing.	None.	None.	End bearing A.K.
		Try solid ankle cushion heel.							
15-20 %	Very Short Below Knee.	Rubber, wood, felt.	Standard.	Wood recommended.	Plastic slip socket. Standard B.K. joint.	Full lacer cuff.	None.	Webb belt, bifurcated kick strap.	Slip socket B.K.
		Try solid ankle cushion heel.							
25-30 %	Short Below Knee "Conventional"	Rubber, wood, felt.	Standard.	Wood recommended. At 7 years try soft socket.	Standard B.K. joint.	Full lacer cuff.	None.	Webb belt, bifurcated kick strap.	Standard B.K.
		Try solid ankle cushion heel.							
40-80 %	Long Below Knee and Very Long Below Knee	Rubber, wood, felt.	Standard.	Wood recommended. At 7 years try soft socket.	Standard B.K. joint.	Full lacer cuff.	None.	Webb belt, bifurcated kick strap.	Standard B.K.
		Try solid ankle cushion heel.							
	Disarticulation at Ankle	Rubber, wood, felt.	Standard.	Wood. If has bulbous end, open lacer of leather.	Standard or Muley strap.	Lacer cuff or Muley strap if end is bulbous.	None.	None.	Ankle disarticulation.
	Chopart Lisfranc	Felt or rubber fore-foot with plantar plate	} Prosthetic experience discouraging in Chopart.						

* It is recommended that girls reaching 12 years be given two feet. One for "high heels" in equinis.
‡ Solid ankle cushion heel (SACH foot), developed by the Univ. of California, Dept. of Engineering, Lower extremity prosthetic research.

Ankle bumpers in children are light 3/8 inch to 3/4 inch in diameter, Adjust to the weight of the child. ‡Solid ankle cushion heel should be

Wood is recommended for shin and thigh piece. This medium is "tooli and facilitates lengthening to accomodate for growth. Growin children must have prostheses lengthened at least three times p year.

Extremely short A.K. stumps are well by a suction socket. The pro thesis must be stabalized by a m hip joint. Bilateral A.K. patients require a very smooth thin wall i the adductor area. This is especial true in girls.

Girls at 12 years of age are social an cosmesis conscious. They demand shaped calf contouring. The forked strap may be secured distally on th laced thigh cuff so that it is not se when girls are sitting down.

Elementary grade B.K. patients may the tibial tubercle area modified wi non-rigid liner, especially boys. Kn flexion contractures in B.K. patien may be stretched out by initially placing the foot in plantar flexion.

Lateral ankle motion assembly is no recommended in children. This appli will not (to date) wear well in activ youngsters - research is in progre

In A.K. cases it is recommended that axis of the knee joint be set poster to prevent buckling, c.f. ab

From the Juvenile Amputa Center, Mary Free Bed H Orthopedic Center, Gra Under the auspices Crippled Children's